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# United States Patent [19]

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[54] EMBEDDABLE MOUNTING DEVICE AND METHOD

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[56] References Cited

## U.S. PATENT DOCUMENTS

480,700	8/1892	Pauly, Sr.	
1,442,588	1/1923	Tompkins	52/36.4 X
1,836,408	12/1931	Sutton	52/607
2,070,641	2/1937	Bartels	211/90
3,546,833	12/1970	Perreton	52/314
3,593,480	7/1971	Bouchillon	52/606 X
3,722,152	3/1973	Schlatter et al.	52/106 X
3,766,699	10/1973	Dinkel	52/607 X
3,932,899	1/1976	Brady et al.	4/3
4,043,086	8/1977	Kaufuss et al.	52/36.4 X
4,321,770	3/1982	Mullins, Jr.	49/50
4,467,574	8/1984	Falge et al.	52/106
4,510,725	4/1985	Wilson	52/606 X

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4,677,794	7/1987	Parron et al.	52/36.4
4,720,952	1/1988	Fricker	242/231.91 X
5,072,556	12/1991	Egenhofer	52/126.4
5,230,195	7/1993	Sease	52/593

FOREIGN PATENT DOCUMENTS

2711469	9/1978	Germany	52/606
8603539	6/1986	WIPO	52/106

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EMBEDDABLE MOUNTING DEVICE AND  
METHOD

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TECHNICAL FIELD

The present invention relates to devices and methods utilized to permanently install fixtures, such as a steel wall plates, a shelves, beds, cabinets, etc., to a wall in a security facility, such as a jail, prison, juvenile detention center, or psychiatric hospital, and more particularly to an embeddable wall construction unit installable within a wall in a manner to have at least one surface exposed to the surface of the wall that is suitable for forming a permanent attachment with fixtures, such as steel wall plates, beds, shelves, cabinets, etc., to anchor the fixture permanently in place, and a method of utilizing the embeddable wall construction unit for permanently securing fixtures to a concrete block wall.

BACKGROUND ART

It is a common practice within the detention industry and other public facilities, such as jails, prisons, juvenile detention centers, and psychiatric hospitals, to permanently affix certain furnishing such as the beds, cabinets, shelves, lavatories, sinks etc. and fixtures such as steel wall plates to the walls of the facility. A steel wall plate is a sheet of steel that is utilized to form or cover an existing wall to provided addition security within a detainment facility. Permanently affixing these fixtures to the walls prevents destruction of the fixtures themselves and reduces the likelihood of an inmate utilizing the fixtures as a weapon to injure a guard or cell mate. The conventional method of permanently installing these fixtures has been to form a cavity within a fully constructed wall unit, install a reinforcing bar or bars into the cavity, and then grouting the reinforcing bar(s) within the cavity using a cementing agent such as cement. A steel plate is then welded or otherwise affixed to the reinforcing bars in a manner to cover the grouted cavity opening. The steel plate acts as a mounting base to which a fixture mounting bracket, such as a length of angle iron, is welded or otherwise permanently affixed.

This method of permanently affixing fixtures to concrete block walls, masonry walls and pre-cast walls is labor intensive and leads to a degraded wall structure. In addition, the gap between the concrete block wall and the steel plate may be used to hide razor blades, knives, drugs, and other contraband articles. It would be a benefit, therefore, to have a embeddable mounting device that could be used in connection with a wall that did not provide a gap between the wall and a steel mounting surface and that forms an integral part of the wall construction. It would also be desirable to have a method for mounting a fixture permanently to a concrete block wall that did not require degrading the wall structure by forming a cavity within the preexisting wall during installation of the fixture.

GENERAL SUMMARY DISCUSSION OF  
INVENTION

It is an object of the invention to provide a embeddable mounting device that is used in connection with a concrete block wall, a masonry wall or a pre-cast wall and that does not provide a gap between the wall and a steel mounting surface when in use.

It is a further object of the invention to provide a method of permanently mounting a fixture permanently to a wall that does not require degrading the wall structure by forming a cavity within a portion of the wall during installation of the fixture.

The first length is preferably between about eight and one-half (8½") and eight and three-quarters (8¾") inches and the first width is preferably between about sixteen and one-half (16½") and seventeen (17") inches to allow the first and second metal plate members to completely fill the space occupied by a conventional concrete block plus the area filled by the cement/grout mixture that is placed between adjacent blocks and is used to cement a plurality of the concrete blocks together to form a wall. Use of the preferably sized first and second metal plate members allows the plate members to directly contact and abut the adjacent concrete blocks located above, below, and to the sides of the mounting device in the concrete block wall within which the mounting unit is installed or embedded. Direct contact with the adjacent concrete blocks eliminates the loosening effect that can occur by the shrinking or squeezing out of the cement or grout from between the adjacent blocks and the mounting device when the mounting device is installed with a layer of cement or grout surrounding the edges of the metal plate members of the mounting device. In addition, because the concrete block is harder than the cement/grout it is more difficult to dig out around the perimeter of the exposed metal plate members to create hiding places for contraband items.

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In another aspect of the invention a method of permanently mounting furniture fixtures to a concrete block wall is provided. The method includes the step of installing a mounting device, of the type described above, into the block wall in place of one of the concrete blocks during construction of the wall. The mounting device is placed into the wall in a manner such that the reinforcing bar receiving cavity of the device is aligned with at least one reinforcing bar receiving cavity of a concrete block. A vertical reinforcing bar is then inserted into the aligned reinforcing bar receiving cavities. A cementing slurry mixture is then poured into the aligned reinforcing bar receiving cavities in a manner such that the vertical reinforcing bar and a quantity of the cementing slurry mixture fills the space between the first and second plate members of the mounting device. The cementing slurry mixture is then allowed to harden. After the cementing slurry mixture has hardened sufficiently to at least hold the mounting device in place, a furnishing fixture may be permanently affixed to the wall by welding one side of a section of angle iron to the outer surface of one of the plate members and the other side of the angle iron section to the fixture. Although it is possible to utilize a mounting bracket, such as a length of angle iron or other bracket configuration, between the outer surface and the fixture, it is preferred to attach the fixture directly to the outer surface of the metal plate member through welding, or with fasteners such as bolts, security bolts, rivets, conventional interlocking connectors, etc.

When threaded connectors such as security or conventional bolts are used, one of the first and second plates preferably has at least two apertures formed therethrough that are each in connection with an internally threaded, threaded connector engaging cavity. The apertures themselves can be threaded for engagement with a threaded connector or a weld nut can be aligned with each aperture and welded to the first or second plate in a manner such that a threaded connector can engage each of the weld nuts. When this embodiment is used, it is important to provide a covering for the weld nuts prior to pouring the quantity of the cementing slurry mixture into the space between the first and second plate members of the mounting device. The covering is preferably a material that will reserve sufficient space adjacent the weld nut within the space between the first and second plates to allow the threaded connector to be fully tightened. A section of foam type plastic material placed over the nut is preferred, however, a plastic cap adapted to the seal the nut from the cement slurry is also sufficient to practice the invention.

#### BRIEF DESCRIPTION OF DRAWINGS

For a further understanding of the nature and objects of the present invention, reference should be had to the following detailed description, taken in conjunction with the accompanying drawings, in which like elements are given the same or analogous reference numbers and wherein:

FIG. 1 is a perspective view of an exemplary embodiment of the embeddable mounting device of the present invention.

FIG. 2 is a side view showing one of the space members and two of the vertical reinforcing bars.

FIG. 3 is a bottom view showing the four vertical reinforcing bars, the three vertical spacer members, the two internal concrete cavities and the two side positioned concrete cavities.

FIG. 4 is a side view of the mounting device of FIG. 1 showing two of the vertical reinforcing bars extending above and below the second metal plate member.

FIG. 6 is a detail perspective view of the completely constructed concrete block wall of FIG. 5 with the mounting device of FIG. 1 installed therein.

FIG. 7 is a schematic view of a concrete block wall having two mounting devices installed.

FIG. 8 is a detail perspective view of the concrete block wall of FIG. 6 with a mounting bracket welded thereto.

FIG. 9 is a schematic view of the concrete block wall of FIG. 7 with a bunk bed permanently affixed thereto.

FIG. 10 is a perspective view of a second exemplary embodiment of the embeddable mounting device of the present invention including a pair of threaded-connector receiving apertures formed through a plate member, each threaded-connector receiving aperture having a weld nut aligned therewith and welded into place to the interior wall of the plate member.

## EXEMPLARY MODE FOR CARRYING OUT THE INVENTION

FIG. 1 is a perspective view of an exemplary embodiment of the embeddable mounting device of the present invention generally designated by the numeral 10. Mounting device 10 includes a first rectangular metal plate member 12; a second rectangular metal plate member 14; first, second and third vertical spacer members 16,18,20; and four vertical reinforcing bars 22,24,26,28. In this embodiment first and second metal plate members 12,14 are both one-quarter ( $\frac{1}{4}$ ) inch thick mild steel plates having a height "A" of eight and five-eighths ( $8\frac{5}{8}$ ) inches and a width "B" of sixteen and three-quarters ( $16\frac{3}{4}$ ) inches. With reference to FIG. 2, first and second plate members 12,14 are secured together and spaced a distance "C", between an outwardly facing first outer surface 30 (more clearly shown in FIG. 1) and outwardly facing second outer surface 32 (more clearly shown in FIG. 4), a distance of seven and five-eighths ( $7\frac{5}{8}$ ) inches, by the three vertical spacer members 16,18,20 (FIG. 3). Each vertical spacer member 16,18,20 is constructed from one-quarter ( $\frac{1}{4}$ ) inch thick mild steel plate having a height of eight and five-eighths ( $8\frac{5}{8}$ ) inches and a width of about nine and one-eighth inches. The shorter height side edges have about a one-quarter inch radius bend located about one inch from, and running parallel to, the shorter eight and five-eighths inch sides. The bends are formed in a manner to form a vertical spacer member 16,18,20 having a U-shaped cross section and including, respectively, a central section 16a,18a,20a, and a pair of leg sections 16b,16c; 18b,18c; 20b,20c. The edges of leg sections 16b,16c are aligned with the edges of first and second plate members 12,14 and welded into place in a manner to form a first end cavity 34. The edges of leg sections 20b,20c are aligned with the edges of first and second plate members 12,14 and welded into place in a manner to form an oppositely directed second end cavity 36. When vertical spacer member 18 is installed, first and second reinforcing bar and cement cavities 37,39 are also formed on either side of vertical spacer member 18.

With reference once again to FIG. 1, the four vertical reinforcing bars 22,24,26,28 are each constructed from about a fifteen and five-eighths (14 $\frac{5}{8}$ ") inch of one-half ( $\frac{1}{2}$ ") inch diameter steel reinforcing bar stock. With reference to FIG. 2, each bar 22,24,26,28 has four forty-five (45°) degree one-half ( $\frac{1}{2}$ ") inch radius bends formed in a manner to create a section 23a that is offset from the two end sections 23b,23c. With reference to FIG. 4, each end section 23b,23c

extends away from mounting device 10 about three (3") inches and, in use, extends into the reinforcing bar and cement receiving cavity of a conventional concrete block

FIG. 5 is a detail perspective view of a partially constructed concrete block wall, generally designated by the numeral 38. Block wall 38 is constructed from a plurality of conventional concrete blocks 40. Each concrete block 40 includes a pair of reinforcing bar and cement receiving cavities 42. A mounting device 10 is shown installed between two concrete blocks 40a, 40b and above two concrete blocks 40c, 40d.

FIG. 6 is a detail perspective view of a completed wall 38 showing mounting device 10 positioned between two concrete blocks 40a, 40b; above two concrete blocks 40c, 40d; and below two concrete blocks 40e, 40f. As shown in the figure, the perimeter edges of plate member 12 directly contact the edges of the surrounding concrete blocks 40a-40f. FIG. 7 is a schematic view showing a pair of mounting devices 10 installed within representative wall 38.

An exemplary method of installing an embeddable to a wall 38 is now described with general reference to FIGS. 1-4 and particular reference to FIGS. 5-9. With reference to FIG. 5, in the exemplary method of permanently attaching a fixture to a block wall, the method includes the step of installing at least one mounting device 10, as described above, into a block wall 38 in place of one of the concrete blocks 40 during construction. Installation of mounting device 10 is as follows: mounting device 10 is placed into wall 38 in a manner such that the reinforcing bar receiving cavities 37, 38 of mounting device 10 are aligned with one reinforcing bar and cement receiving cavity 42 (not shown) each from concrete blocks 40c, 40d, 40e, 40f. With vertical reinforcing bar end sections 23b, 23c in place, a cementing slurry mixture is then poured into the aligned reinforcing bar receiving cavities 37, 39, and 42 in a manner such that vertical reinforcing bars 22, 24, 26, 28 and a quantity of the cementing slurry mixture fill the aligned reinforcing bar and cement receiving cavities 37, 39, of mounting device 10 and the aligned reinforcing bar and cement receiving cavities of concrete blocks 40c, 40d, 40e, 40f. The cementing slurry mixture is then allowed to harden while the wall 38 is fully constructed as shown in FIG. 7.

Once wall 38 is fully constructed, a furnishing fixture, such as a bunk bed assembly 44 (FIG. 9) may be permanently affixed to wall 38 using two brackets 46, 48. With reference to FIG. 8, in this exemplary method brackets 46, 48 are lengths of angle iron having a first side 50 and a perpendicularly oriented second side 52. Fixture 44 is mounted to plate member 12 by placing fixture 44 against wall 38 in a manner such that a section of fixture 44 is adjacent one of the mounting devices 10. Each first side 50 of each bracket 46, 48 is welded to a plate member 12 and each second side 52 is welded to fixture 44. Fixture 44 is now permanently attached. It can be seen that by advantageously positioning, at various heights and various spacings, one or more mounting devices 10 into a wall 38 during construction the method may be utilized to permanently install a variety of fixtures 44 to a block wall 38.

FIG. 10 shows a second exemplary embodiment of the embeddable mounting device of the present invention, generally designated by the designation 10a. In this